

**ABSTRACT**

A power supply connectable to a source of AC line voltage for AC electric arc welding by an AC arc current across a welding gap between an electrode and a workpiece, the power supply comprises a high capacity transformer that converts said line voltage to an AC output voltage, and a rectifier that converts the AC output voltage to a DC voltage between a positive terminal and a common terminal at generally zero volts and a negative terminal and the common terminal. The power supply has a first switch that connects the positive terminal to the common terminal across the gap when a gate signal is applied to the first switch, a second switch for connecting the negative terminal to the common terminal across the gap when a gate signal is applied to the second switch and a pulse width modulator operated for generating pulses at a frequency of at least about 18 kHz. A logic network has a first circuit for directing the pulses to the first switch for a first time, a second circuit for directing the pulses to the second switch for a second time and a controller to alternately operate first and second circuits to create AC arc welding current.